The Impact of Supply Chain Resilience Strategies, Technology and the Floricultural Firms Performance, the Nakuru Kenya Story

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ABSTRACT

Changes are unavoidable in today's risky and uncertain business environment including unpredictable supply chains of which the floriculture industry is not exempt The floriculture industry frequently encounters diverse and new challenges which must be managed to avoid losses, recovery challenges and even closure. It is important that firms employ relevant updated technology to enhance their resilience strategies to prepare for such disruptions, to continue existing and improve performance. However whether technology jointly contributes significantly in enhancing resilience and performance in floricultural firms is a topic that remains under-explored. Using the relevant empirical literature, the study sheds light on the relationship between resilience strategies and floricultural firms performance under the moderating effect of supply chain technology. The study adopted descriptive research design. Target population was 101 flower firms in Nakuru County-Kenya. Purposive sampling was used to pick 255 respondents. Moderated multiple regression analysis was used to test the moderating effect of supply chain technology. Performance was the dependent variable while supply chain resilience strategies i.e. supply chain collaboration, supply chain agility, supply chain flexibility and supply chain risk management were predictor variables. The study established that supply chain technology positively and significantly moderated the relationship between the supply chain resilience strategies and performance of floricultural firms. The study findings contribute to existing literature and provide practical recommendations to policy makers and floricultural supply chain managers to establish effective resilience policies and appropriate use of technology to manage and survive the unforeseen disruptions which will contribute significantly to their improved performance.

Key words- Supply Chain Technology, Supply Chain Collaboration, Supply Chain Flexibility, Supply Chain Agility, Supply Chain Risk Management, Performance Kenya.

INTRODUCTION

We reside in a VUCA world; Volatile, Uncertain, Complex, and Ambiguous [7]. The floriculture industry frequently encounters diverse and new challenges: ranging from man-made to natural disasters which must be managed to avoid losses, recovery challenges and even closure [13].Covid-19 pandemic distressed the supply of flowers according [42].The floricultural sector experienced declining sales [28]. In Kenya the farms took stringent measures to control cost which affected production cycle and quality [18]. The Central Bank of Kenya did a survey in 2021 to assess the extent of recovery in the flower sector and found that flower export orders remained strong, conversely, fears were there of order cancellation in case of inflexible lockdowns due to the third wave of the pandemic [8]. With the adaptation for technology, flower demand has picked up as seen in the Brazilian floricultural sector [28]. Information technology has revolutionized supply chains positively by improved coordination, competitiveness, information sharing and processing, efficiency and responsiveness enabling firms to handle unexpected situations promptly ([34]-[22]). Thus technology augments supply chain resilience in floricultural firms amid the ever present challenges in this sector. Supply chain resilience refers to the capacity of a supply chain to persevere, adjust or adapt regardless of change [41].

A. Research Problem

Typically, the floriculture industry is exemplified by seasonality due to demand on particular occasions and it encounters diverse and high frequency challenges. Kenyan flower farms face challenges of: stock contamination in storage, costly production, natural disasters and strikes ([13]- [25]). Recently Covid-19 pandemic harshly hit the floriculture industry affecting their logistics and supply chains [26]. Flower demand went under worldwide due to stoppage or severe restriction of events like weddings resulting in a loss of $300,000 a day [19]. Some measures the farms took to control production cost affected production cycle and quality exposing flowers to pest and disease [18]. However, some firms relied on their concrete global information technology (IT) linkage to continue operating [22]. IT will enable firms to handle unexpected situations swiftly [34].This formed the basis of undertaking a study on the moderating effect of technology on the relationship between supply chain resilience strategies and the floricultural firms performance, in the County of Nakuru, Kenya. Specific objectives were:

1. To establish the moderating effect of supply chain technology on the relationship between supply chain collaboration strategies and the floricultural firms performance, in the County of Nakuru, Kenya.
2. To examine the moderating effect of supply chain technology on the relationship between supply chain flexibility strategies and the floricultural firms performance, in the County of Nakuru, Kenya.
3. To establish the moderating effect of supply chain technology on the relationship between supply chain agility strategies and the floricultural firms performance, in the County of Nakuru, Kenya.
4. To establish the moderating effect of supply chain technology on the relationship between supply chain risk management strategies and the floricultural firms performance, in the County of Nakuru, Kenya.
5. To examine the moderating effect of supply chain technology on the relationship between supply chain resilience strategies (supply chain collaboration, supply chain flexibility, supply chain agility and supply chain risk management) and the floricultural firms performance, in the County of Nakuru, Kenya.

LITERATURE REVIEW

- **Theoretical Review**

*1)- Unified Theory of Acceptance and Use of Technology (UTAUT)***:** This is a technology acceptance theory from 2003[36]. It explicates the aims of a user of information systems and the user's consequent usage behavior. The theory is based on four antecedents: performance expectancy, effort expectations, social influence, and facilitating conditions.

According to [36], performance expectancy is the level to which an individual considers utilizing a system to enhance job performance; effort expectancy on the other hand is the user-friendliness of the system; while social influence is an individual's perception that people who matter most endorse and support their utilization of the system and finally, facilitating conditions refer to the level to which a user assesses the adequacy of the technical and organization infrastructure to support system usage. The UTAUT will illuminate the concept of technology in this study by establishing the adoption, usage and performance outcome of supply chain technologies used by flower firms in Nakuru County Kenya to enhance their supply chain resilience.

- **Empirical Review**

1)- Supply Chain collaboration Strategies and Performance: Supply chain collaboration is the business-to-

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business relationships differing in form, context and scale where parties have common goals they jointly work to attain [14]. Key collaboration activities improving supply chain resilience in natural disasters are: effective communication, information sharing or exchange, informal financial support, joint trust and dependence, jointly created knowledge and relationship efforts ([45]-[46]). Information sharing, supply chain visibility and strategic supplier partnership were used in this study.

Technology enhances supply chain resilience by providing a platform for information sharing and visibility for collaborating partners. According to [4] e-supply chain collaboration is a firm's ability to utilize e-business applications to coordinate activities, sustain information exchange and do online collaboration and processes with its partners. Hence the study's null hypothesis states that:

H_{01}: Supply chain technology has no significant moderating effect on the relationship between supply chain collaboration strategies (information sharing, visibility and strategic partnership) and floricultural firms performance, in the County of Nakuru, Kenya.

2)- Supply Chain Flexibility and Performance: Supply chain flexibility is an important strategy that allows companies deal with interruptions and develop resilience by adapting rapidly to changing conditions [31]. Flexibility is a key strategy in managing demand, supply, process, and environmental disruptions [21]. Re-engineering supply chains can achieve resilience [47]. From research, the reputable flexibility pointers that enhance supply chain resilience are sourcing, production, delivery or order fulfillment and transport flexibility ([47]-[48]). This study examined supply chain re-engineering, production and delivery flexibility. The attainment of supply chain flexibility is possible through the implementation of information technology [12]. Flower firms can build flexibility by adopting technologies that respond to demand and supply volatility that is present in the sector to enhance resilience. The study's null hypothesis states that:

H_{02}: Supply chain technology has no significant moderating effect on the relationship between supply chain flexibility strategies (supply chain re-engineering, production flexibility, and delivery flexibility) and floricultural firms performance, in the County of Nakuru, Kenya.

3)- Supply Chain Agility and Performance: Supply chain resilience is represented by a supply chain architecture that is adaptive [36]. Reference [39] depict it as changing continuously in order not to be changed. This ability can be derived from an agile supply chain that is capable of adjusting to varying demands by adapting the supply chain design to unexpected developments in the environment of business [4]. Supply chain agility is considered as one of the several strategies rendering a supply chain resilient ([15]-[5]). Reference [11] portray agility as a core factor for surviving environmental threats when the supply chain is at risk. This study looked at demand forecasting, decisiveness and inventory management agility metrics. Due to an increased end-to-end visibility across supply chain operations, the network can provide an agile response to potential disruptions that strengthens the supply chain resilience [32].

Technology advancement and e-business applications have considerably transformed supply chain agility and the overall performance of firms and supply chains ([6]-[4]). Hence the study's null hypothesis states that:

H_{03}: Supply chain technology has no significant moderating effect on the relationship between supply chain agility strategies (demand forecasting, decisiveness and inventory management) and floricultural firms performance, in the County of Nakuru, Kenya.

4)- Supply Chain Risk Management and Performance: Some supply chains pull through inevitable and unexpected disruptions much successfully than others as every supply chain is unique with risk mitigation strategies customized to suit their supply chain [43]. COVID-19 pandemic confirmed the importance of reacting, adapting and setting up mechanisms for crisis management to withstand uncertainty situations [17].

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Organizations should recognize and analyze the risk exposure and have risk reduction plans that influence productivity [29]. Supply chain risk mitigation eradicates the possibility of a risk taking place, decrease its impact or shift its effects to a third party [9].Technology has a potential to achieve excellence in decision-making when managing severe disruption and enhances resilience [16]. Hence the study's null hypothesis states that:

H_{04}: Supply chain technology has no significant moderating effect on the relationship between supply chain risk management (accept risk, reduce risk and transfer risk) and floricultural firms performance, in the County of Nakuru, Kenya.

5)- Supply Chain Technology and Performance: Reference [10] posits that IT enhances processing capabilities and information sharing favorable for disruption recoveries. Linking business operations with IT is important during and after a disruption guaranteeing swift response, firm survival, adaptation and increased performance ([34], [35] -[22].

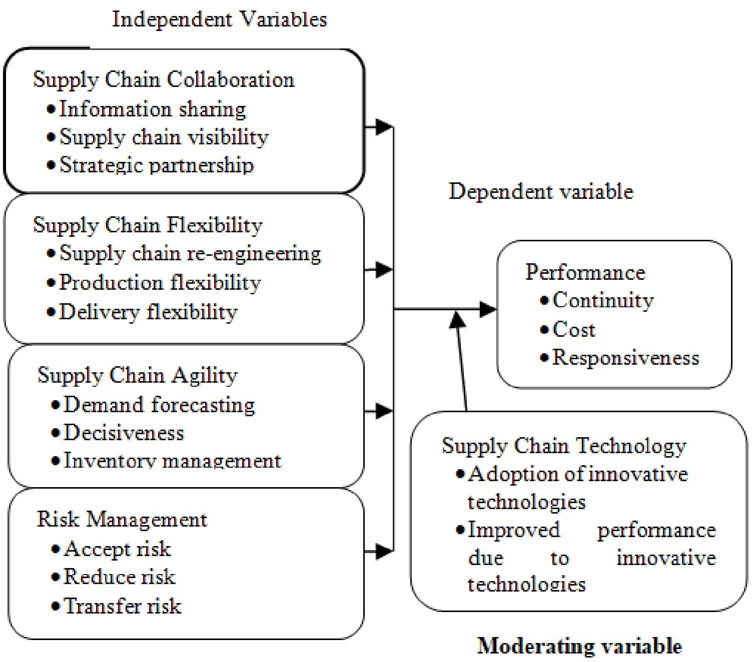
According to [38] supply chains are predisposed to various risk because of their complex and dynamic nature which can be managed by big data analytics through blockchain technology. The big data analytics and IT infrastructure enable firms to respond to unpredicted changes and disruptions [22]. The importance of big data in disaster management is in its ability to envisage, scrutinize and forecast disasters which enhance supply chain performance through resilience and innovation ([2]-[23]).

The Internet of Things (IoT) technologies gives efficient decision making and management capabilities enabled by data security, blockchain and big data analytics technologies ([3]-[33]). Scholars have established that supply chains performance improved significantly and enhances resilience under the moderating effect of technology ([30], [27]-[1]). Hence the study's null hypothesis states that:

H_{05}: Supply chain technology has no significant moderating effect on the relationship between supply chain resilience strategies (collaboration, agility, flexibility and risk management) and floricultural firms performance, in the County of Nakuru, Kenya.

The conceptual framework is illustrated in figure one:

Fig. 1 Conceptual Framework



Source: Research Data, (2023).

RESEARCH METHODOLOGY

- **Design and Data Collection**

Descriptive research design was used, the researcher analysed quantitative data collected by structured questionnaires. Primary data was used.

- **Population and Sample**

The study focused on floricultural industry in Nakuru County-Kenya. The study population was 101 flower firms with a sample of 51calculated by a formulae adopted from Yamane [44] at 90% confidence level with 10% margin of error. Purposive sampling was used to pick 255 respondents at managerial levels.

- **Data Analysis**

Descriptive statistics and Moderated multiple regression (MMR) analysis was used to test the moderating effect of supply chain technology on supply chain resilience strategies and performance. To establish the interaction effects using MMR, Ordinary Least Square (OLS) and MMR model equations were formed.

OLS Equation $Y = \alpha 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \varepsilon$ ……………………………………………………….(1)

MMR Equation $Y = \alpha 0 + \beta 1X1Z + \beta 2X2Z + \beta 3X3 Z + \beta 4X4Z + \varepsilon$ ….…………………………………………………….(2)

Where: Y = Performance

β_0= Constant or coefficient of intercept

?$_1$ = Coefficient of Supply Chain Collaboration

X_1 = Supply Chain Collaboration

β_2 = Coefficient of Supply Chain Flexibility

X_2 = Supply Chain Flexibility

β_3 = Coefficient of Supply Chain Agility

X_3= Supply Chain Agility

β_4 = Coefficient of Supply Chain Risk Management

X_4 = Supply Chain Risk Management

ε = Error term.

Z= Corresponding coefficients for the moderating variable

RESULTS

A. Descriptive statistics for supply chain technology

From table I, majority of the questions yield a mean value between 3.41 – 4.20 with an average mean of 3.64; varied by a standard deviation of 1.001. This implies that majority of the respondents concurred with the questions.

Table I. Descriptive Statistics for Supply Chain Technology

	N	Mean	Std. Deviation
1. Technology in procurement and supply functions	197	3.56	1.112
2. Technology is utilized in flower farming	197	3.89	0.928
3. Technology is utilized in forecasting	197	3.53	0.998
4. Technology enable continuous business operation	197	3.72	1.009
5. Technology reduces production wastages	197	3.81	0.871
6. Technology allow quick response to demand changes	197	3.32	1.085
Average score		3.64	1.001
Valid N (listwise)	197		

- **Hypothesis Testing**

The null hypothesized relationships were tested using F-test by comparing the ρ values, at 0.05 significance level. If $\rho \leq 0.05$, reject null hypothesis. The model summary and significance results and is in two models. Model 1 indicate results when the effect of the moderator is not included and model 2, when the moderator is included

1)- Effect of Supply Chain Collaboration Strategies on Performance of Floricultural Firms: As shown in table II, the significant predictors explained 66.4% of the variance (R^2=.664, Adj R^2=.659), F(3,193)=127.140, ρ<0.05; t=10.461, without the moderator in model 1. The predictors' explanatory power increased significantly when the moderator was incorporated as it accounted for 82.9% of its variability (R^2=0.829, Adj R^2=.827), F(6,190)=159.778, ρ<0.05; t=20.014) in model 2. H_{01}: Supply chain visibility and strategic partnership exhibited a positive and significant effect on performance without the moderator (supply chain technology), apart from information sharing (β=0.006, ρ>0.05). However with the inclusion of the moderator all individual predictors exhibited a positive and significant effect on performance: Information sharing (β =0.358, ρ<0.05) t=1.453; supply chain visibility (β=0.119, ρ<0.05) t=2.363; strategic partnership (β=0.281, ρ<0.05) t=2.489; Information Sharing XSCT (β=0.042, ρ<0.05), supply chain visibility XSCT (β=0.042, ρ<0.05) and strategic partnership XSCT (β=0.018, ρ<0.05). Thus $H_{01}$was rejected.

Table II. Moderated Regression Coefficients of Supply Chain Collaboration Strategies and Performance

Model	Variables	B	S.E	β	t	ρ
1	(Constant)	1.339	0.128		10.461	0.000
	Information sharing	0.004	0.084	0.006	0.053	0.958
	Supply chain visibility	0.462	0.080	0.612	5.744	0.000
	Strategic Partnership	0.158	0.039	0.248	4.018	0.000

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2	(Constant)	2.235	0.112		20.014	0.000
	Information sharing	0.358	0.246	0.368	1.453	0.048
	Supply chain visibility	0.119	0.328	0.386	2.363	0.017
	Strategic Partnership	0.281	0.189	0.171	2.489	0.008
	Information Sharing XSCT	0.042	0.019	0.458	2.253	0.025
	supply chain visibility XSCT	0.042	0.017	0.558	2.502	0.013
	strategic partnership XSCT	0.018	0.008	0.441	2.245	0.026

Model 1: R=0.815[a;] R^2=0.664; R^2_{Adj}=0.659; $\rho \leq 0.05$

Model 2: R=0.911[b;] R^2=0.829; R^2_{Adj}=0.827; $\rho \leq 0.05$

2)- Effects of supply chain flexibility strategies on performance of floricultural firms: The predictors in table III model 1, without the moderator explained 73.4% of the variance (R^2 =.734, Adj R^2 =.726), F(3,193)=11.120, ρ<0.05; t=16.222. However, the explanatory power of the predictors increased significantly when the moderator was incorporated as it accounted for 74.7% of its variability (R^2= 0.747, Adj R^2 =.734), F(6,190)=87.536, ρ<0.05; t=31.777) in model 2. H_{02}: Individual predictors had a positive and significant effect on performance with the inclusion of the moderator: supply chain re-engineering (β=2.110, ρ<0.05) t=5.978; production flexibility (β=1.807, ρ<0.05) t=4.969; delivery flexibility (β=0.142, ρ>0.05) t=2.614; supply chainre -engineering XSCT (β=0.531, ρ<0.05) t=5.876, production flexibility XSCT (β=0.440, ρ<0.05) t=4.607 and delivery flexibility XSCT (β=0.059, ρ<0.05) t=2.965. Thus H_{02} was rejected

Table III. Moderated Regression Coefficients of Supply Chain Flexibility Strategies and Performance

Model	Variables	B	S.E	β	t	*P*
1	(Constant)	1.643	0.262		6.265	0.000
	Demand Forecasting	0.090	0.064	0.128	2.412	0.039
	Decisiveness	0.450	0.093	0.429	4.834	0.000
	Inventory Management	0.179	0.078	0.264	2.291	0.023
2	(Constant)	2.528	0.161		15.731	0.000
	Demand Forecasting	0.756	0.188	0.076	4.032	0.000
	Decisiveness	0.182	0.115	0.174	2.579	0.006
	Inventory Management	0.363	0.204	0.534	2.777	0.047
	Demand forecasting XSCT	0.160	0.045	0.354	3.581	0.000
	Desiciveness XSCT	0.054	0.035	0.403	2.564	0.019
	Inventory management XSCT	0.074	0.053	0.651	2.396	0.044

Model 1:R=0.857[a;] R^2=0.734; R^2_{Adj}=0.726; $\rho \leq 0.05$

Model 2:R=0.864[b;] R^2=0.747; R^2_{Adj}=0.734; $\rho \leq 0.05$

3)- Effects of supply chain agility strategies on performance of floricultural firms: In model 1, the predictors explained 72.9% of the variance (R^2 =.729, Adj R^2 =.719), F(3,193)=31.569, ρ<0.05; t=6.265 without the moderator. However, the explanatory power of the predictors increased significantly in model 2 with the moderator as it accounted for 81.2% variance (R^2= 0.812, Adj R^2 =.806), F(6,190)=136.536, ρ<0.05; t=15.731). H_{03}: All individual predictors exhibited a positive and significant effect on performance with the moderator: demand forecasting (β=0.756, ρ<0.05) t=4.032; decisiveness(β=0.182,ρ<0.05) t=2.579; inventory management (β=0.363, ρ>0.05) t=2.777; demand forecasting XSCT (β=0.160,ρ<0.05)t=3.581, decisiveness

XSCT (β=0.054,$\rho<0.05$) t=2.564 and inventory management XSCT (β=0.074, $\rho>0.05$) t=2.396. Thus H_{03} was rejected as shown in table IV.

Table IV. Moderated Regression Coefficients of Supply Chain Agility Strategies and Performance

Model	Variables	B	S.E	?	t	?
1	(Constant)	1.643	0.262		6.265	0.000
	Demand Forecasting	0.090	0.064	0.128	2.412	0.039
	Decisiveness	0.450	0.093	0.429	4.834	0.000
	Inventory Management	0.179	0.078	0.264	2.291	0.023
2	(Constant)	2.528	0.161		15.731	0.000
	Demand Forecasting	0.756	0.188	0.076	4.032	0.000
	Decisiveness	0.182	0.115	0.174	2.579	0.006
	Inventory Management	0.363	0.204	0.534	2.777	0.047
	Demand forecasting XSCT	0.160	0.045	0.354	3.581	0.000
	Desiciveness XSCT	0.054	0.035	0.403	2.564	0.019
	Inventory management XSCT	0.074	0.053	0.651	2.396	0.044

R=0.854[a;] R^2=0.729; R^2_{Adj}=0.719; $\rho \leq 0.05$

R=0.901[b;] R^2=0.812; R^2_{Adj}=0.806; $\rho \leq 0.05$

4)- Effects of supply chain risk management on the performance of floricultural firms: The results in table V model 1 without the moderator, indicated the predictors explained 61.1% of the variance (R^2 =0.611, Adj. R^2 =0.597), F(3,193)=8.018, ρ<0.05; t=17.513. However, in Model 2, the explanatory power of the predictors increased significantly when the moderator variable supply chain technology was incorporated into the model as it accounted for 68.9% of its variability (R^2= 0.689, Adj R^2 =.679), F(6,190)=70.251, ρ<0.05; t=31.106). H_{04}: Individually, all the moderated predictors exhibited a positive and significant effect on performance: accept risk (β=0.090, ρ<0.05) t=1.983;

reduce risk (β=0.758, ρ<0.05) t=2.057; transfer risk (β=0.450, ρ>0.05) t=1.351; accept risk XSCT (β=0.039, <0.05) t=1.971, reduce risk XSCT (β=0.221, ρ<0.05) t=2.163 and transfer risk XSCT (β=0.119, ρ>0.05) t=1.244. Thus H_{04} was rejected.

Table V. Moderated Regression Coefficients of Supply Chain Risk Management Strategies and Performance

Model	Variables	B	S.E	?	t	?
1	(Constant)	3.016	0.172		17.513	0.000
	Accept Risk	0.013	0.071	0.020	1.981	0.045
	Reduce Risk	0.045	0.072	0.076	1.986	0.041
	Transfer Risk	0.156	0.072	0.254	2.176	0.031
2	(Constant)	3.314	0.107		31.106	0.000
	Accept Risk	0.090	0.266	0.132	1.983	0.036
	Reduce Risk	0.758	0.368	0.276	2.057	0.041
	Transfer Risk	0.450	0.333	0.733	1.351	0.035
	Accept risk XSCT	0.039	0.065	0.328	1.971	0.048
	Reduce risk XSCT	0.221	0.102	0.994	2.163	0.032

	Transfer risk XSCT	0.119	0.096	0.073	1.244	0.015

Model 1: R=0.782[a]; R^2=0.611; R^2_{Adj}=0.597; $\rho \leq 0.05$

Model 2: R=0.830[b]; R^2=0.689; R^2_{Adj}=0.679; $\rho \leq 0.05$

*5)- Overall effect of Supply Chain Resilience Strategies on the Performance of Floricultural Firms under the Moderator Supply Chain Technology***:** The results in table VI model 1 without the moderator, show the predictors explained 74% (R^2=.740, Adj R^2=.735), F(4,192)=136.932, ρ<0.05; t=3.266 of the variance. In model 2, the explanatory power of the predictors increased significantly when the moderator was incorporated into the model as it accounted for 89.4% of its variability (R^2= 0.894, Adj R^2 =.891), F(5,192)=136.932, ρ<0.05; t=4.627). Thus null hypothesis H_{05} was rejected.

Table VI. Moderated Regression Coefficients of Supply Chain Resilience strategies and Performance

Model		B	S.E	?	t	?
1	(Constant)	0.508	0.155		3.266	0.001
	SCCS	0.572	0.032	0.735	17.609	0.000
	SCFS	0.073	0.039	0.110	1.975	0.035
	SCAS	0.155	0.035	0.178	4.397	0.000
	SCRMS	0.223	0.039	0.324	5.649	0.000
2	(Constant)	0.461	0.100		4.627	0.000
	SCCS	0.357	0.024	0.458	14.555	0.000
	SCFS	0.025	0.025	0.038	1.984	0.026
	SCAS	0.075	0.023	0.086	3.248	0.001
	SCRMS	0.138	0.026	0.200	5.338	0.000
	SCT	0.349	0.021	0.510	16.630	0.000

Model 1: R=0.860[a]; R^2=0.740; R^2_{Adj}=0.735; $\rho \leq 0.05$

Model 2: R=0.946[b]; R^2=0.894; R^2_{Adj}=0.891; $\rho \leq 0.05$

Where: SCCS-Supply chain collaboration strategies, SCFS-Supply chain flexibility strategies, SCAS-Supply chain agility strategies, SCRMS-Supply chain risk management strategies

DISCUSSION

Clearly, it is apparent that floricultural firms have adopted innovative technologies and experience improved performance. Supply chain technology improves floricultural firms' resilience during the frequent and dynamic disruptions characterized in this sector. The findings concur with those of different scholars linking business operations with information technology as important during and after a disruption guaranteeing swift response, firm survival, adaptation and increased performance ([34], [35]-[22]). Reference [40] also found out that technology builds supply chain resilience as it ensured operation stability during the COVID-19 pandemic. The tested H_{01} to H_{05} are discussed as follows:

It is evident that supply chain technology moderates the relationship between supply chain collaboration strategies (information sharing, supply chain visibility and strategic partnership) and floricultural firms performance, in the County of Nakuru, Kenya. This is consistent with [4] that information technology enhances collaboration as companies share and coordinate resources and other capabilities. Since floricultural firms are constantly in need of information on market dynamics and uncertainties to forecast demand and supply needs, strategic partnership and investing in technologies like blockchain, IoT and big data analytics will enhance information sharing and visibility across the supply chain. Reference, [10] is also of the view that information technology enhances information sharing which is favorable in disruption recoveries. The timely and available information will improve flower firms' performance and resilience from the various disruptions that are characterized in this sector

It is noted that supply chain technology moderates the relationship between supply chain flexibility strategies (supply chain re-engineering, production flexibility, and delivery flexibility) and floricultural firms performance, in the County of Nakuru, Kenya. This is consistent with the arguments of [12] that supply chain flexibility can be achieved by deploying information technology.

Further, [20] postulate that information technology emphasize operational flexibility with different impacts on firm recovery. Similarly,[22] argues that implementing IT can improve a firm's effectiveness in initiating reconfigurations towards supply chain disruptions. Technology will thus enable floricultural firms to re-engineer their supply chains to integrate readiness and quick response in production changes due to order variations or uncertain transportation arising from the ever present or sudden disruptions.

It's eminent that supply chain technology moderates the relationship between supply chain agility strategies (demand forecasting, decisiveness and inventory management) and floricultural firms performance, in the County of Nakuru, Kenya. The results concur with various scholars that technology advancement and e-business applications have considerably transformed supply chain agility and overall performance of firms and supply chains ([6]-[4]). Also, [16] contends that technology has the potential to excel in decision-making when dealing with significant disruptions and bolstering resilience. Equally, [22] contends that firms should deploy technology to understand the environmental trends and create recovery solutions from supply chain disruptions. Floricultural firms employ supply chain agility during demand forecasting, decisiveness and inventory management. Therefore, technologies such as big data can enhance the agility of the supply chain by incorporating preparedness to enable swift and efficient responses ahead of fluctuations in flower demand or supply, which may result from the frequent disruptions in the floricultural industry.

It is established that supply chain technology moderates the relationship between supply chain risk management strategies (accept risk, reduce risk and transfer risk) and floricultural firms performance. Reference [38] contends that supply chains are prone to risks because of their complex and dynamic nature which can be managed by big data analytics through blockchain technology. Similarly, [2] aver that the power of big data in disaster management lies in its capacity to envisage, analyze and predict disasters. Hence, technology will improve the risk management strategies of floricultural firms prior, during and after a disruption, ensuring sustained and enhanced performance.

Finally, it's evident that there is a significant moderating effect of supply chain technology on the relationship between supply chain resilience strategies (collaboration, flexibility, agility and risk management) and floricultural firms performance, in the County of Nakuru, Kenya. The findings are in sync with various scholars who opine that deploying technologies to enhance supply chain resilience is beneficial for the firms ([3], [33]). Thus, floricultural firms are likely to be sustainable if they augment resilience strategies by adopting relevant up-to-date technology to predict and prepare for the diverse, ever new risks in the industry.

CONCLUSION

This study investigated the impact of technology on supply chain resilience strategies and floricultural firms' performance in Nakuru County-Kenya with a view to examine if technology significantly affected the relationship between supply chain resilience strategies and performance. This was in relation to the need to enhance supply chain resilience by floricultural firms in order to survive the diverse and ever new risks present in this sector. It is evident that supply chain technology moderated the relationship between supply chain resilience strategies and the performance of floricultural firms.

Investing in technologies like blockchain, IoT and big data analytics will enhance collaboration by enabling strategic partnership, information sharing and visibility across the supply chain, guaranteeing resilience and improved performance. Technology will also enable floricultural firms to re-engineer their supply chains incorporating flexibility to allow quick and effective response to changes in flower production due to order variations or uncertain transportation arising from unforeseen disruptions. The timely and available information from using technologies like blockchain or big data analytics will augment the agile supply chains, enabling quick decision making and effective response to the changes in flower demand prior, during or after a disruption. Technology will help to predict and prepare for the diverse and ever new risks present in the floricultural industry assuring continued and improved performance.

Policies should be formulated therefore, that promote the extensive use of the right and up to date supply chain technologies in the floricultural sector which are relevant to the resilience strategies in use to enhance resilience and improve performance linked to cost saving, swift response to a crisis and business continuity amid a crisis.

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